PAGE

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 631581

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	3a. USQ Required?	4. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	Brett C. Simpson, Data Assessment and Interpretation, R2-12, 373-5915	[] Yes [X] No	06/25/96
	5. Project Title/No./Work Order No.	6. Bldg./Sys./Fac. No.	7. Approval Designator
	Tank 241-BX-109	241-BX-109	N/A
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.)	9. Related ECN No(s).	10. Related PO No.
	WHC-SD-WM-ER-572, Rev. 0	N/A	N/A

11a. Modification Work	11b. Work Package No.	11c. Modification Work Complete	11d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)	N/A	N/A Cog. Engineer Signature & Date	N/A Cog. Engineer Signature & Date

12. Description of Change

This ECN is being generated in order to exchange page 5-7. When the document was initially released, pages 5-6 and 5-7 were duplicates.

13a. Justification (mark one)

Criteria Change	[]	Design Improvement	[]	Environmental	[]	Facility Deactivation	[]
As-Found	[]	Facilitate Const	[]	Const. Error/Omission	[]	Design Error/Omission	[X]

13b. Justification Details

Page 5-7 was a duplicate of page 5-6. The correct page 5-7 needed to be placed in the document.

14. Distribution (include name, MSIN, and no. of copies)

See attached distribution.

RELEASE STAMP

DATE: JUN 26 1996

HANFORD RELEASE

STA: 4

ID: 2

A-7900-013-2 (11/94) GEF095

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1)
ECN-631581

15. Design Verification Required	16. Cost Impact				17. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog. Eng. B.C. Simpson Butt Simpson	6/25/96	PE	
Cog. Mgr. J.G. Kristofzski	6/26/96	QA	
QA		Safety	
Safety		Design	
Environ.		Environ.	
Other		Other	
		DEPARTMENT OF ENERGY	
		Signature or a Control Number that tracks the Approval Signature	
		ADDITIONAL	

Tank Characterization Report for Single-Shell Tank 241-BX-109

Brett C. Simpson
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: ECN-631581 UC: 2070
Org Code: 79400 Charge Code: N4G4D
B&R Code: EW 3120074 Total Pages: 211

Key Words: Tank 241-BX-109, Tank BX-109, BX-109, BX Farm, Tank Characterization Report, TCR, Single-Shell Tank, Waste Characterization, Waste Inventory, TPA Milestone M-44

Abstract: N/A

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Release Approval 6/26/96 Date Release Stamp

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RECORD OF REVISION

(1) Document Number: WHC-SD-WM-ER-572

Page 1

(2) Title
Tank Characterization Report for Single-Shell Tank 241-BX-109

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release (5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) Initially released 05/31/96 on EDT-615376.	J.G. Field	J.G. Kristofzski
0-A RS	Incorporate per ECN-631581.	B.C. Simpson	J.G. Kristofzski 6/26/96

significantly different from each other. Because each segment is represented by a lower and upper portion, segment level data were analyzed using half-segment resolution. This analysis showed that 16 of the analytes (primarily ICP metals) had P values less than 0.01.

The ANOVA performed on the core composite level revealed that for analytes that contributed substantially to the waste matrix (ie. > 10,000 μg/g), very little variability was observed between cores. Relative standard deviations for those analytes were generally less than 10%. They were somewhat higher for analytes present in smaller quantities, but usually not exhibiting extreme variability.

A multivariate cluster analysis was performed on a set of analytes (Cl^-, NO_2^-, NO_3^-, PO_4^{-3}, SO_4^{-2}, Al, Ca, Fe, Mg, Na, Ni, P, S and U). This effort provided two results. It described qualitatively the potential spatial structure within the tank BX-109 waste by identifying similar groups of observations. It also described quantitatively each group or potential waste layer, based on the mean analyte concentration of the associated group of observations. Figure 5-1 illustrates the grouping from results of the clustering analysis. A discussion of the characteristics of each cluster and the cluster analysis approach is included in Appendix E.

In summary, based on the visual descriptions of the samples and the statistical results, the tank contents appear to consist of two distinct layers in the vertical direction (Figure 5-1). The upper layer (segment 1 and the upper half of segment 2) is higher in PO_4, NO_2, Al, and Ca, and lower in U concentration than the lower layer. This could be attributed to improvements in uranium recovery processing at U Plant, which resulted in removing more uranium in later years. Composition of the top segment would also be expected to vary due to the tank-to-tank transfers of supernatant in the later years. Very little variability was observed between cores of the composite level. More detailed results of the ANOVA and multivariate cluster analyses are included in Appendix E.

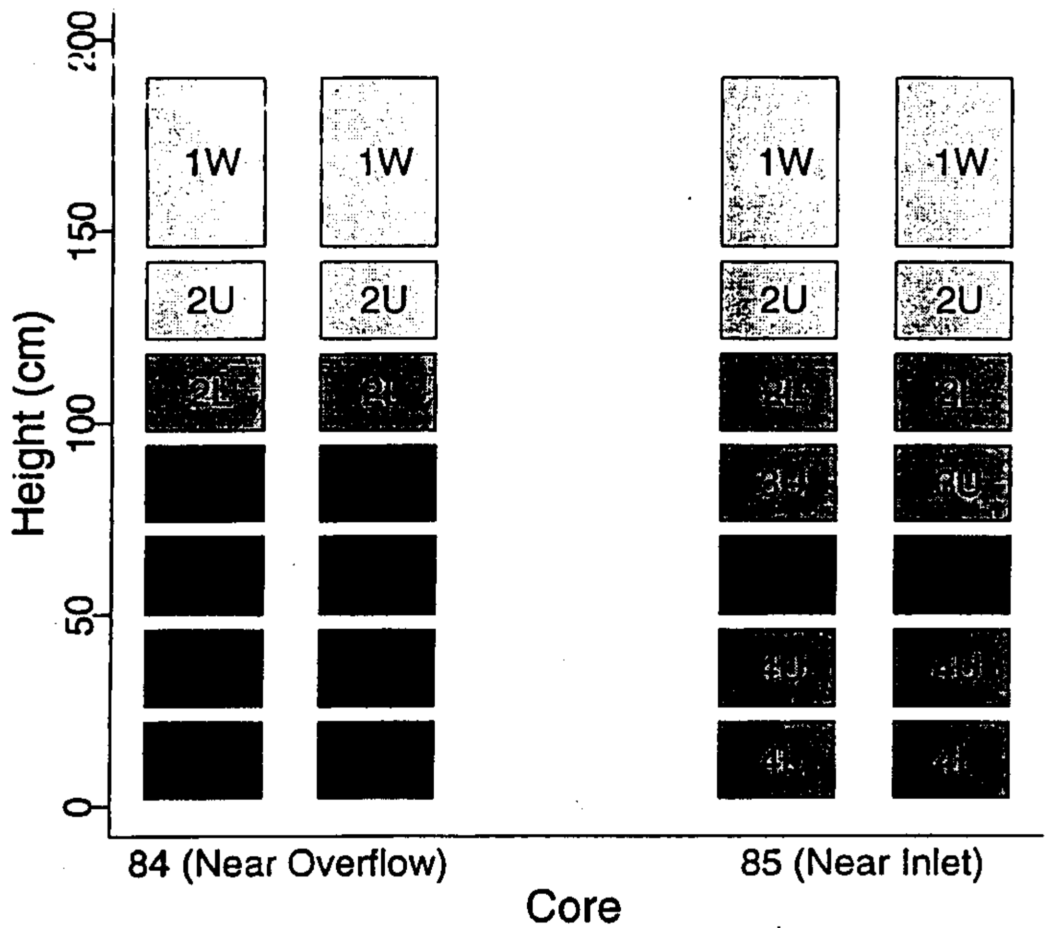
No visual indications or analytical data gathered support the presence of 1C waste in the tank. This information, coupled with the process history data, indicates that the tank contents are entirely UR waste.

5.4 COMPARISON OF TRANSFER HISTORY WITH ANALYTICAL RESULTS

The Hanford Defined Waste (HDW) estimates (Agnew 1996) and TLM estimates for tank 241-BX-109 (Agnew et al. 1996) are compared with the analytical results from the 1995 sampling event in Tables 5-4 and 5-5.

Based on historical tank transfer records, tank 241-BX-109 is expected to contain UR type waste. All historical fingerprint analytes (Na, Fe, H_2O, SO_4 and U) for segment 3 (upper half) were greater than 10% of HDW estimates for a UR waste type and passed the gateway analysis. However, the HDW values were lower than the segment analyses for several of the analytes, especially if water loss through evaporation is considered. HDW estimates were

Figure 5-1. Clustering Results for the BX-109 Cores.
(Refer to color figure in Appendix E, Figure E-3)



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Tank Characterization Report for Single-Shell Tank 241-BX-109, WHC-SD-WM-ER-572, Rev. 0-A		ECN No. ECN-631581

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